



The roles of social stress and decision-making in non-suicidal self-injury



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ABSTRACT

Research suggests that individuals with a history of non-suicidal self-injury (NSSI) do not have difficulty generating alternatives to social problems but choose more negative solutions, suggesting a deficit in decision-making. However, studies report no significant differences in risky decision-making on a performance-based task among individuals with and without NSSI histories. A limitation of these studies is that decision-making was only assessed at baseline. As individuals with a history of NSSI typically self-injure when experiencing negative emotions, decision-making ability may become impaired specifically in the presence of these emotions. The aim of the current study was to investigate decision-making ability among individuals with and without NSSI histories both at baseline and following a distressing social exclusion task. We compared individuals with ($n=48$) and without ($n=72$) NSSI histories on the Iowa Gambling Task, a behavioral measure of risky decision-making, before and after exclusion or inclusion on the Cyberball task. Results indicated no significant group differences in performance regardless of condition. When participants were grouped by racial/ethnic minority status, results indicated that non-Hispanic White individuals with a history of NSSI exhibited deterioration in risky decision-making ability following social exclusion. Potential explanations for these findings and clinical implications are discussed.

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1. Introduction

Non-suicidal self-injury (NSSI) is defined as the deliberate, self-inflicted destruction of body tissue without suicidal intent and for purposes not socially sanctioned ([International Society for the Study of Self-Injury, n.d.](#)). NSSI includes behaviors such as cutting, burning, scratching, and self-hitting ([Walsh, 2008](#)) and does not include behaviors such as piercings or tattoos. The prevalence of NSSI is high in community samples of adults (e.g., [Rodham and Hawton, 2009](#)) and college students ([Paivio and McCulloch, 2004](#); [Whitlock et al., 2006](#)) and the behavior has many clinical correlates, including increased anxiety, depression, borderline personality disorder (BPD) characteristics, and suicide ([Ross and Heath, 2002](#); [Andover et al., 2005](#); [Klonsky and Olino, 2008](#); [Wilkinson et al., 2011](#)).

Research on the functions of NSSI has provided overwhelming support for an automatic negative reinforcement function, in

which NSSI is utilized as a method to reduce or eliminate negative affect (see [Klonsky, 2007](#), for a review). Individuals may also engage in NSSI for social reinforcement, such as escaping interpersonal task demands or getting a response from others ([Nock and Prinstein, 2004](#)). Interpersonal antecedents are central to each of these functions. Between 34% and 85% of individuals with a history of self-injury reported experiencing loneliness before an episode of NSSI ([Bennum and Phil, 1983](#); [Briere and Gil, 1998](#); [Laye-Gindhu and Schonert-Reichl, 2005](#)). Further, [Hawton and Harriss \(2006\)](#) found that among the problems immediately preceding deliberate self-harm, which is a term that does not distinguish between those who self-injured with and without suicidal intent, were social isolation (35.5%), relationship with family (29.4%), relationship with partner (25.9%), bereavement/loss (16.7%), and relationship with friends (7.4%).

When faced with stressful life events, individuals with an NSSI history may be less equipped to cope with the associated unpleasant emotions in an adaptive manner, instead using NSSI as a coping mechanism (e.g., [Haines et al., 1995](#)). It has been hypothesized that individuals with a history of NSSI have difficulty solving social problems; however, [Nock and Mendes \(2008\)](#)

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examined social problem-solving among adolescents with and without NSSI histories and found no significant group differences in the average number of solutions generated in response to challenging social scenarios, both at baseline and following a distressing task. Participants did choose significantly more negative solutions across scenarios compared to individuals with no NSSI history, indicating that decision-making may be a salient area of difficulty for individuals with an NSSI history.

However, studies of objective decision-making ability among individuals with an NSSI history suggest otherwise. In studies using the Iowa Gambling Task (Bechara et al., 1994), a behavioral measure of risky decision-making, results showed no significant differences in performance between individuals with and without NSSI histories in adult (McCloskey et al., 2012) and adolescent (Janis and Nock, 2009) samples. Oldershaw et al. (2009) also found no differences in performance between individuals with and without a history of self-injury; however, they did not distinguish between self-injury with and without intent to die. A major limitation of the aforementioned studies is that objective decision-making ability was only assessed at baseline. As individuals with a history of NSSI typically self-injure when experiencing negative emotions, it is possible that decision-making ability becomes impaired specifically in the presence of these emotions.

The aim of the current study was to investigate decision-making ability, specifically risky decision-making, among individuals with and without NSSI histories at baseline and following a stressful social exclusion task, which was chosen given the roles of isolation and loneliness as self-reported precursors to NSSI episodes (e.g., Laye-Gindhu and Schonert-Reichl, 2005). Given the centrality of these precursors, and because individuals with an NSSI history report that they are more emotionally reactive than individuals with no NSSI history (Gratz and Roemer, 2008; Heath et al., 2008; Glenn et al., 2011) we hypothesized that among individuals who were socially excluded, those with an NSSI history would report greater distress than individuals with no NSSI history. Next, based on the aforementioned research by McCloskey et al. (2012), we hypothesized that at baseline, there would be no significant differences in risky decision-making ability between individuals with and without histories of NSSI. Finally, as research has suggested that compared to those with no NSSI history, individuals with an NSSI history choose more negative solutions across problem-solving scenarios following a distressing task (Nock and Mendes, 2008), we hypothesized that individuals with a history of NSSI who were socially excluded would perform more poorly on an objective risky decision-making task than individuals with an NSSI history who were socially included, and individuals with no NSSI history.

2. Methods

2.1. Participants

Participants ($N=120$) were 48 young adults with at least one lifetime episode of NSSI (NSSI+ group) and 72 adults with no lifetime history of NSSI (NSSI–group). The mean age of the entire sample was 21.94 years ($SD=2.82$). The sample was 64.2% female ($n=77$), and 26.7% ($n=32$) of the sample was Hispanic. Regarding race, 53.3% of the sample described their race as White, 22.5% as Black or African American, 10% as Asian, 7.5% as other, 4.2% as more than one race, 1.7% as unknown, and 0.8% as Native Hawaiian or other Pacific Islander. The majority of the sample (76.7%) completed some college or a two-year program. Inclusion criteria for the current study included individuals between the ages of 18 and 29 with and without NSSI histories; given that NSSI is a transdiagnostic behavior (Bentley et al., 2014) there were no exclusion

criteria on the basis of psychiatric diagnosis.

2.2. Measures

The Functional Assessment of Self-Mutilation (FASM; Lloyd et al., 1997) is a self-report measure that assesses functions of NSSI, methods used, frequency, and age of onset. Internal consistency estimates for the FASM are good (Penn et al., 2003; Kaess et al., 2013) and the measure is strongly correlated with measures of suicidal ideation, past suicide attempts (Guertin et al., 2001) and recent suicide attempts (Shaffer et al., 1996). In this study, the FASM was used to assess NSSI and suicide attempt history, and the internal consistency in this study was $\alpha=0.88$.

Depression was assessed using the Beck Depression Inventory-II (BDI-II; Beck et al., 1996), a 21-item self-report measure designed to assess the severity of depressive symptoms over the past two weeks. Symptoms are rated on a four-point Likert-type scale, with higher scores representing greater depression severity. The psychometric properties of the BDI-II are well established (e.g., Beck et al., 1996) and internal consistency for the measure in this study was excellent ($\alpha=0.93$).

Emotion dysregulation was assessed using the Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer, 2004), a 36-item self-report measure. This measure was included as a clinical covariate due to its association with NSSI (e.g., Gratz et al., 2006) and our focus on individuals' ability to engage in goal-directed activity in the presence of negative emotions. Participants indicate on a five-point Likert-type scale how often each item applies to them, with higher scores indicating greater emotion dysregulation. The DERS has been used successfully with college (e.g., Glenn and Klonsky, 2009) and adult populations (e.g., Herr et al., 2013). In the current study, internal consistency was $\alpha=0.93$.

The McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003) was used to assess BPD features. BPD commonly co-occurs with NSSI (Andover et al., 2005) and is associated with impaired decision-making (LeGriss et al., 2012). The MSI-BPD is a 10-item self-report measure with a total score that ranges from 0 to 10. In the current study, the self-injury criterion was removed from analyses. Internal consistency ($\alpha=0.74$) and test-retest reliability ($\rho=0.72$) of the MSI-BPD are good (Zanarini et al., 2003) and internal consistency in the current study was adequate ($\alpha=0.73$).

2.3. Induction of social exclusion

Social exclusion was simulated using Cyberball, a virtual ball-toss game widely used to examine exclusion and rejection (Williams et al., 2000; Williams and Jarvis, 2006). In Cyberball, participants believe they are playing an online ball-tossing game with other participants in order to practice their mental visualization skills; in fact, the "others" are controlled by the computer program. Participants were randomly assigned to either the "inclusion" condition (receiving the ball for one-third of the throws) or the "exclusion" condition (receiving the ball for the first two throws only). Cyberball has been shown to reliably induce feelings of being ostracized (e.g., Bernstein and Claypool, 2012; Gratz et al., 2013) and has received support as a negative mood induction paradigm, with individuals reporting more negative mood (Bernstein and Claypool, 2012; Kelly et al., 2012), general distress (Gratz et al., 2013), and physiological arousal (Boyes and French, 2009; Kelly et al., 2012) following exclusion compared to inclusion.

2.4. Assessment of risky decision-making ability

The Iowa Gambling Task (IGT; Bechara et al., 1994) is a computerized behavioral measure used to assess risky decision-

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